Synopsis

Inter-departmental Dyadic Coordination with Reference to Human Resource and Operations Management:

Current Status and Strategic Approaches

Synopsis for Ph. D. in Management

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Section I: Introduction

Operations management (OM) and Human Resources Management (HRM) have historically been very separate fields. In practice, operations managers and human resource managers interact primarily on administrative issues regarding payroll and other matters. In academia, the two subjects are studied by separate communities of scholars publishing in disjoint sets of journals, drawing on mostly separate disciplinary foundations. Yet, operations and human resources are intimately related at a fundamental level. Operations management explains and moderates the effects of human resource activities such as pay, training, communications and staffing as stated by Boudreau et al. (2002).

Within the human resource management (HRM) perspective, psychology-based practices, especially empowerment, extensive training, and teamwork, are seen as vital to sustained competitive advantage. Other approaches, such as those of integrated manufacturing and lean production, place greater emphasis on operational initiatives such as total quality management, just-in-time, advanced manufacturing technology, and supply-chain partnering as determinants of organizational performance. As per Birdi et al. (2008) investigated the relative merits of these practices through a study of the productivity of 308 companies over 22 years. Consistent with HRM theory, they found performance benefits from empowerment and extensive training, with the adoption of teamwork serving to enhance both the departments. In contrast, none of the operational practices were directly related to productivity, nor did they interact with other practices in ways fully consistent with the notions of integrated manufacturing or lean production.

The fields of Operations management (OM) and human resources management (HRM) have a long history of separateness. In industry, it has been rare for an operations manager to become a human resources manager or vice versa. Despite this, operations and human resources are intimately tied to one another in virtually all business environments.

Boudreau et al. (2002) gave an example, consider the case of a Big Three auto company power-train facility with a history of poor budget performance and low efficiency. In spite of a high-profile corporate

emphasis on lean manufacturing and the best efforts of the company's lean engineers and Sixsigma black belts, the plant continued to underperform until 2001 when a new plant manager took over. Immediately recognizing that the primary cost driver was throughput (failure to make production quota during regular time required expensive overtime), he zeroed in on the largest source of output loss, blocking and starving in the line. But, because he knew that the majority of stoppages were due to people-induced disruptions, the new manager eschewed the traditional OM focus on equipment-induced causes and worked instead to involve operators in the problem solving process.

Several months were spent educating the workforce on the drivers of performance (e.g., the importance of bottlenecks) and setting up mechanisms for formally recognizing people for their successes (in non-monetary ways, since this was a union facility). In less than a year, the plant was transformed into one of the best performers in the company, despite a down economy.

The lesson from this case study is that human considerations can be vital in the success of operations improvement programs. By helping workers to understand the implications of the OM design for their work and then motivating them to act accordingly the plant turned around its performance. Boudreau et al. (2002).

Section II: Review of Literature

The initial studies on Human Resource Management and Operations management put forward strong arguments that there is coordination between the departments to a low level, whereas, strong effective interaction, collaboration and coordination is required between both the departments to positively bring forth the organizational outcomes.

Studies have been categorized based on the interaction, collaboration and coordination found out in the organisations along with the outcomes achieved.

Table 1: Tabular summary of Literature Review- Arranged in ascending order of the year of publication

S.No	Paper Author	HR/OM Integration	HR/OM Collaboration	HR/OM Coordination	Job Satisfaction	Competency Mapping	T&D	Effective Communication	Harmony	Information Flow	Others
1.	Fleishman E. A. (1953)	√	√	√			√				
2.	Boella (1987)	√	√	√			√	√		√	
3.	Snell et al. (1992)	√	√				√				
4.	Huselid (1995)	√	√	√	√	√					Retention
5.	Youndt et al. (1996)	√	√	√			√			√	
6.	Brian Becker et al. (1996)	√	√	√	√			√	√	√	
7.	Brusco et al. (1998)	√	√	√			√				
8.	Kim (2001)	√	√	√	√			√	√	√	
9.	Daily (2001)	√	√	√	√	√			√		
10.	Morey et al. (2002)	√	√	√	√		√		√		Teamwork
11.	Boudreau et al. (2002)	√	√	√	√			√	√		Motivation
12.	Gowen III et al. (2003)	√	√				√				
13.	Clothilde et al.	√	√	√							Time Management

	(2004)										
14.	Wright et al. (2005)	√	√	√	√			√	√	√	
15.	Birdi, et al. (2008)	√	√	√			√				Company Performance
16.	Macduffie et al. (2011)	√	√	√			√		√		High Commitment. Positive Relationship
17.	Crescenzio et al. (2011)	√	√		√		√			√	
18.	Kiessling et al. (2012)	√			√	√					Retention
19.	Kehoe et al. (2013)	√	√	√	√			√		√	
20.	Jabbour et al. (2013)	√	√	√	√	√		√	√	√	
21.	Lengnick-Hall et al. (2013)	√	√	√		√		√			Strategic Partnership, Trust
22.	Ellinger et al. (2014)	√	√	√		√					
23.	Bromiley et al. (2015)	√	√			√					
24.	Arthur et al. (2015)	√	√	√	√						Organization Performance and Turnover
25.	Jabbour et al. (2016)	√	√	√		√	√				Teamwork
26.	Jacobs et al. (2016)	√	√	√	√			√	√	√	
27.	Longoni et al. (2016)	√	√	√		√	√				Financial Performance
28.	Sinesilassie et al. (2017)	√	√	√				√	√	√	
29.	Kasonde et al. (2017)	√	√	√	√	√	√				
30.	Kaufmann et al. (2017)	√	√		√	√					Motivation

Source: Self

Fleishman E. A. (1953) emphasizes on training of the employees working in production department, timely and proper training to the employees make them work with more productivity with better time and cost management.

Boella (1987) study explains effective staff, committed to company objectives, confident of their skills and deriving satisfaction from their work will not result in isolation but in connect with the human

resource department. This requires efficient training and development delivered to the employees, good communication between the two departments and harmony between them.

Snell et al. (1992) examined the relationship between integrated manufacturing, defined as the use of advanced manufacturing technology (AMT), just-in-time inventory control (JIT), and total quality management (TQ), and human resource management from a human capital perspective. Data from managers and non-managers showed several direct and interactive effects. AMT was positively related to selective staffing, comprehensive training, developmental appraisal, and externally equitable rewards for operations employees and to selective staffing for quality employees.

Huselid (1995) comprehensively evaluated the links between systems of high Performance work practices and firm performance. Results based on a national sample of nearly one thousand firms indicate that these practices have an economically and statistically significant impact on both intermediate employee outcomes (turnover and productivity) and short- and long-term measures of corporate financial performance.

Youndt et al. (1996) examines two alternative views—universal and contingency—of the human resources (HR)-performance relationship in manufacturing settings. Results from a survey of 97 plants primarily support a contingency approach to human resource management (HRM). An HR system focused on human capital enhancement was directly related to multiple dimensions of operational performance (i.e., employee productivity, machine efficiency, and customer alignment), but subsequent analysis revealed that this main effect was predominately the result of linking human-capital-enhancing HR systems with a quality manufacturing strategy.

Brian Becker et al. (1996) describes human resource decisions are likely to have an important and unique influence on organizational performance. A rapidly changing economic environment, characterized by globalization and deregulation of markets, changing customer and investor demands and ever increasing product -market competition has become the norm for most organizations. For this, a better understanding

must be developed regarding the role of human resource decisions in creating and sustaining organizational performance and competitive advantage.

Brusco et al. (1998) examined service operations that utilize cross-trained employees face complex workforce staffing decisions that have important implications for both cost and productivity. These decisions are further complicated when cross-trained employees have different productivity levels in multiple work activity categories.

Kim (2001) explores the relationship between participative management in the context of the strategic planning and job satisfaction in local government agencies. The results of multiple regression analysis show that managers use of a participative management style and employee's perceptions of participative strategic planning processes are positively associated with high levels of job satisfaction. The study also finds that effective supervisory communications in the context of the strategic planning process are positively associated with high levels of job satisfaction. The study suggests that participative management that incorporates effective supervisory communications can enhance employees' job satisfaction.

Daily (2001) identifies human resource factors such as top management support, environmental training, employee empowerment, teamwork, and rewards systems as key elements of the implementation process of an environmental management system.

Morey et al. (2002) pointed out effectiveness of formal teamwork training for improving team behaviors, reducing errors, and improving staff attitudes.

Boudreau et al. (2002) emphasized OM and HRM are intimately dependent on one another as management functions in practice. Traditional OM research has omitted and/or simplified human behavior, sometimes to the point where it has caused the resulting models to yield results that are not only

quantitatively inaccurate, but are also qualitatively misleading. Through the interaction between the departments employees feel motivated and work enthusiastically.

Gowen III et al. (2003) in the study examines the critical impact of human resource factors on the competitive advantage of supply chain management. The study clearly states that employee training is the key factor to attain the organizational outcomes through the coordination of the two departments.

Clothilde et al. (2004) emphasized on personnel factor, it was the only factor in their research that was marginal for project success. construct validity of the human resources factor has been examined and a model proposed. Results show, first of all, that although there was a link between project success and the Personnel factor (based on the correlation analyses), this factor did not have a significant impact on project success. The factor which had a significant impact on project success was the time management for each and every activity performed.

Wright et al. (2005) examined Significant research attention has been devoted to examining the relationship between HR practices and firm performance, and the research support has assumed HR as the causal variable. This study examines how measures of HR practices correlate with past, concurrent, and future operational performance measures. The results indicate that correlations with performance measures at all three times are both high and invariant, and that controlling for past or concurrent performance virtually eliminates the correlation of HR with future performance.

Birdi et al. (2008) explained in the study, within the strategic human resource management (SHRM) perspective, psychology-based practices, especially empowerment, extensive training, and teamwork, are vital to sustained competitive advantage. Competitive advantage contributes effectively to company's overall performance.

Macduffie et al. (2011) emphasized that innovative HR practices affect performance not individually but as interrelated elements in an internally consistent HR "bundle" or system and that these HR bundles contribute most to assembly plant productivity and quality when they are integrated with manufacturing

policies under the "organizational logic" of a flexible production system. Also, emphasis was made on commitment and harmony between the two departments.

Crescenzio et al. (2011) examined recent statistics on causes of aviation accidents and incidents demonstrate that to increase air-transportation safety, reduction of human errors impact on operations should be made. So, the industry should first address human factors related to people in stressful roles to significantly minimize such errors. In particular, aviation maintenance employees work under high-pressure conditions- that is, they're under strict time constraints and must adhere to stringent guidelines. Because of such constraints, they might be prone to making errors.

Kiessling et al. (2012) proposed acquisitions are often used as a way to engage in corporate venturing. The value of these ventures tends to reside in the knowledge and capabilities of the key management team members who have and maintain key inter-organizational relationships. Because their knowledge and/or relationships may be tacit and therefore difficult to transfer, retaining the key managers in the acquired organization is often a critical issue for the human resource management of the acquiring organization.

Kehoe et al. (2013) study examined the relationships between employees' perceptions of high-performance HR practice use in their job groups and employee absenteeism, intent to remain with the organization, and organizational citizenship behavior, dedicating a focus to the possible mediating role of affective organizational commitment in these relationships. This study examined the coordination between the two departments contributed towards job satisfaction, communication and information flow.

Jabbour et al. (2013) examined Human resource management tends to support environmental management. Lean manufacturing practices tend to support environmental management. Environmental management practices favor operational performance. Coordination between the two departments lead to job satisfaction, effective communication, better harmony and effective information flow.

Lengnick-Hall et al. (2013) emphasized HR systems that support collaborative supply chain relationships lead to competitive benefits. HR system design principles support an integrative supply chain orientation.

Supply chain attributes determine the benefit of a tight fit among HR practices across firms. The coordination between the two departments is explained by efficient training and development and effective communication.

Ellinger et al. (2014) proposed that there is an ongoing shortage of talented supply chain managers with the necessary skills and business-related competencies to manage increasingly complex and strategically important supply chain processes. Organizations can create and maintain competitive advantage by leveraging the expertise of human resource development (HRD) professionals to provide a range of developmental and change-oriented interventions related to critical supply chain manager skill sets that are currently in short supply.

Bromiley et al. (2015) evaluates the usefulness of the resource-based view to the field of operations management. The study suggests that training and development is essential for the operations department to work effectively.

Arthur et al. (2015) in the study has shown that identification of human resource systems promises to add significantly to understanding the relationship between turnover and organizational performance. Emphasis has been made on the job satisfaction of employees through the coordination between the two departments.

Jabbour et al. (2016) in the study has shown the coordination between the two departments and the outcomes competency mapping and training and development. The integration between the two departments has led to efficient competency mapping which in turn focuses on the appropriate role deployment according to the skill sets available.

Jacobs et al. (2016) study explores from the perspective of Social Capital Theory, the effect of internal communication and employee satisfaction on supply chain integration; supply chain integration being comprised of internal and external integration with trading partners. It emphasizes on employee job

satisfaction, harmony within the departments, better communication and information flow between the two departments.

Longoni et al. (2016) said Balancing environmental, social, and economic performance is today considered a key responsibility that firms have toward society. This paper addresses this gap investigating how the deployment of environmental management in the human resource function—adopting green human resource management (GHRM) practices—and the supply chain function—adopting green supply chain management (GSCM) practices—impact on environmental and financial performance.

Sinesilassie et al. (2017) emphasized the factors responsible for impacting performance in the organization. Study revealed communication, harmony and information flow are the main factors impacting the performance of employees and the organization. Time overrun is one of the most significant issues being faced by Ethiopian construction industry today. For effective time performance, the successful execution of construction projects and keeping them within prescribed schedule is very important.

Kasonde et al. (2017) emphasized Human resources is the backbone of any system and the key enabler for all other functions to effectively perform. In order to drive the change that is required for sustainability and continuous improvement, every immunization supply chain needs an effective leader. A dedicated and competent immunization supply chain leader with adequate numbers of skilled, accountable, motivated and empowered personnel at all levels of the health system to overcome existing and emerging immunization supply chain (ISC) challenges. Without an effective supply chain leader supported by capable and motivated staff, none of the interventions designed to strengthen the supply chain can be effective or sustainable.

Kaufmann et al. (2017) examines cross-functional sourcing teams, differences in goals and personality traits can lead to tensions and reduced effectiveness. Diversity in teams can be conceptualized as surface-level diversity (e.g., gender, nationality) or as deep-level diversity (e.g., personality, attitudes). This study

investigates the potentially negative effects of one category of deep-level diversity – namely, affective trait diversity – on sourcing team performance and how such negative effects might be mitigated through team members' emotional intelligence. Job satisfaction and competency mapping are the main factors emphasized in this study.

Section III: Research Design

3.1 Need for Study

With today's increasing globalization and associated growing demand for talented Operations managers, human resource management (HRM) in operations management has emerged as a top priority for firms. However, a thorough analysis of HRM issues in Operations research has not been made so far.

As stated by Gowen III et al. (2003) HRM is critical to the success of Operations, and HRM concepts and practices can support the implementation of operations practices stated by Ellinger et al. (2014) New and multidisciplinary points of view are needed when pursuing more sustainable production practices stated by Pagell et al. (2014).

It is only then that HR will be really seen as responding to the emerging challenges of the operations team. A discussion about each of these outcomes will enrich the HR manager about the new expectations and also the business manager about taking active support from HR, to demand service in order to obtain business driven outcomes.

Operations orientation should be present in the entire organization across levels and should be supported by the top management. Even, in spite of its own structure, employees at all levels should be sensitized to thinking and working with a proper supply chain orientation. In fact, supply chain orientation can be combined with other HR driven outcomes, such as internal customer orientation. Systems thinking is again primarily a situation, when each person in the organization is able to understand the transactions and the systems and respond accordingly to the customer and to realign the work processes.

Systems thinking is a part of Learning Organization as stated by Senge (1994) and there is a big role for HR to act as an en-abler to build or convert the organization into a Learning Organization. Commitment,

cooperation and team spirit are essentially connected with the organization culture and leadership aspects and hence, they are primarily to be driven by HR and the top management. The other business driven outcomes on people are to be essentially driven by business because many of them are related to the operational aspects and connected to the core of the job.

Little has been done on the relation between Human Resource Management and Operations Management. This is a challenging situation because the better people are managed within and between organisations in operations relationships, the better will be the operation functions.

The need is to identify the Interaction, Collaboration and Coordination levels between Human Resources and Operations in the organisation and their outcomes.

3.2 Objectives

The proposed thesis has the following objectives:

Objective 1: To analyse the importance of collaboration between the functions of Human Resource Management and Operations Management.

The purpose here is to find the importance of collaboration between Human Resource and Operations department in the organisations. The need here is to identify the ways and the time duration in which both the departments interact and collaborate with each other and the impact on outcome.

Objective 2: To assess the current status of interaction, collaboration and coordination between the departments of Human Resource Management and Operations Management.

The endeavor here is to identify the present state of coordination between Human resource and Operations department in the organisations. Present scenario of interaction, collaboration and coordination has to be identified. This will help in identifying the improvements that can be implemented to enhance the level of coordination between both the departments so that they effectively contribute to the outcomes.This can be measured by evaluating the status of dimensions such as training and development, communication level, conflicts and information flow in the oraganisations.

Objective 3: To examine the outcomes of Human Resource Management and Operations Management coordination in the organisations.

The need here is to identify the outcomes being achieved through the coordination between Human Resource and Operations department in the organisations and the ways in which those outcomes like job satisfaction, training and development, communication, harmony, information flow can be improved and new initiatives can be brought in.

Section IV: Overview of Proposed Research

4.1 Conceptual framework and Hypotheses

Figure 1: Conceptual Framework

Source: Self

4.1.1 Interaction View of Integration

It emphasizes the use of communication in the form of meetings and information flows between departments. Interaction activities are information exchange activities that include committee meetings, teleconferencing, conference calls, memoranda, and the exchange of documents in standard forms as stated by (Kahn and Mentzer 1998). A strict interaction perspective may encourage departments to act independently with fixed meeting schedules. Such independence may force departments to compete and the departments will seek optimization of their objectives separately in favor of their respective department. Therefore, this does not mean that the interaction should be avoided because it has some positive influences on the achievement of the goals of the organization as a whole. On the other hand, too many meetings (i.e., too much interaction) may overburden Human Resource personnel. Thus, a certain level of interaction is necessary for effective relationships between Human Resource and other departments.

Overall, literature supports a direct, positive relationship between interaction and performance success. Several empirical researches have shown that low levels of communicative interaction between departments were a reason for failure in coordination as stated by Carlsson et al. (1991). Figure 1 shows that interaction has a positive influence on performance in terms organizational outcomes like Job Satisfaction, Competency Mapping, Training and Development, Cost Management, Effective Communication, Lesser Conflicts and Information Flow between both the departments.

4.1.2 Collaborative View of Integration

A second view of integration, collaboration view, is also discussed in (Kahn and Mentzer 1998), which is commonly characterized as an affective, volitional and mutual/shared process. The collaboration view has defined integration as "a state of high degrees of shared values, mutual goal commitments, and collaborative behaviors" (Kahn and Mentzer 1998). Collaboration is distinguished from interaction as it focuses on working together, having mutual understanding, having a common vision, sharing resources, and achieving collective goals.

Thus, in collaborative approach the departments feel highly interdependent, working closely together to achieve mutual/shared goals. Such goals have their roots in shared vision for the company to which all departments agree.

Collaboration would decentralize authority to empower lower levels of management to work with other departments, which might be problematic if centralized decision making is preferred. Collaboration also encourages informal interdepartmental efforts, which are unstructured in nature. This may confuse employees over their roles in nature which may lead to a sense of frustration among employees. A third issue is that collaboration is an involved process and sometimes it may not provide immediate results because of time and resources spent to participate in interdepartmental training and other activities.

Literature supports a direct, positive relationship between collaboration and performance success. In this approach, due to mutual understanding and resource sharing, the collaboration approach is cost effective and less redundant in taking decisive actions.

4.1.3 Coordination View of Integration

A third view of integration, coordination view is discussed in Dyer et al. (1998) which clearly states that firm need to develop effective coordination within and beyond its boundaries in order to maximize the potential for converting competitive advantage into profitability. The firm should develop effective coordination among various departments to achieve the organization goals and objectives.

Coordination among independent firms, such as raw-material suppliers, manufacturers, distributors, third-party logistics providers and retailers, is the key to attaining the flexibility necessary to enable them to progressively improve logistics processes in response to rapidly changing market conditions. Poor coordination among the chain members can cause dysfunctional operational performance. Some of the negative consequences of poor coordination include higher inventory costs, longer delivery times, higher transportation costs, higher levels of loss and damage, and lowered customer service as discussed by Lee et al. (1997).

Since changes that occur in any one of the chain members are likely to affect the performance of the others, coordination is useful for managing interdependent logistics activities in order to mitigate demand variability and unnecessary inventory. A process of planning, executing and controlling the interdependencies of activities carried out by different departments/business units in order to create value for the end customer is known as supply chain management as stated by Lambert et al. (1998).

Literature mentions the way coordination is necessary between different levels of supply chain. The same way coordination is essential between different departments in the organization so as to achieve the organizational outcomes. Each and every department in the organization works in collaboration with one another and thus coordination between various departments of the organization is the key to success for them.

4.1.4 Organizational Outcomes

Better job satisfaction, efficient competency mapping and effective training and development are the employee specific outcomes achieved by coordination between both the departments, however, effective

communication, better harmony and effective information flow are organizational outcomes achieved by the coordination between both the departments.

4.1.5 Hypotheses

Interaction and Coordination

Interaction emphasizes the use of communication in the form of meetings and information flows between departments. Interaction activities are information exchange activities that include committee meetings, teleconferencing, conference calls, memoranda, and the exchange of documents in standard forms by (Kahn and Mentzer 1998).

Coordination emphasizes working of various departments of the organizations in sync with one another. The way tasks are planned and formulated, same way they are implemented leads to coordination in the organization. Thus, the following null and alternate hypotheses are formulated: -

Ho1→ Interaction between Human Resource and Operations does not lead to interdepartmental coordination.

Ha1→ Interaction between Human Resource and Operations leads to interdepartmental coordination.

Collaboration and Coordination

Collaboration is discussed in Kahn and Mentzer (1998), which is commonly characterized as an affective, volitional and mutual/shared process. The collaboration view has defined integration as "a state of high degrees of shared values, mutual goal commitments, and collaborative behaviors" (Kahn and Mentzer 1998). It focuses on working together, having mutual understanding, having a common vision, sharing resources, and achieving collective goals.

Coordination emphasizes working of various departments of the organizations in sync with one another. The way tasks are planned and formulated, same way they are implemented leads to coordination in the organization. Collaboration in the organization may or may not lead to coordination. Thus, the following null and alternate hypotheses are formulated: -

Ho2→ Collaboration between Human Resource and Operations does not lead to interdepartmental coordination.

Ha2→ Collaboration between Human Resource and Operations leads to interdepartmental coordination.

Human Resource and Operations Interdepartmental Coordination and Organizational Outcomes

Interdepartmental Coordination emphasizes working of various departments of the organizations in sync with one another. The way tasks are planned and formulated, same way they are implemented leads to coordination in the organization.

Organisational Outcomes are the outcomes which are achieved in terms of job satisfaction, training and development, competency mapping, cost management, effective communication, information flow and lesser conflicts. The need here is to identify whether the Interdepartmental coordination brings out organizational outcomes. Thus, the null and alternate hypotheses are formulated as given below in sub-sections.

Job Satisfaction

Job Satisfaction is the range of issues which affect an individual's experience of work, or their quality of working life. Job satisfaction can be understood in terms of its relationships with other key factors, such as general well-being, stress at work, control at work, home-work interface, and working conditions. Job satisfaction can be influenced by a person's ability to complete required tasks, the level of communication in an organization, and the way management treats employees. So, the need here is to identify whether the Interdepartmental Coordination between Human Resource and Operations department lead to Job Satisfaction of employees.

Ho3(a)→ Human Resource and Operations interdepartmental coordination does not lead to better job satisfaction.

Ha3(a)→ Human Resource and Operations interdepartmental coordination leads to better job satisfaction.

Competency Mapping

Competency mapping identifies an individual's strengths and weaknesses. The aim is to enable the person to better understand himself or herself and to point out where career development efforts need to be directed. Roles are deployed to the employees according to the different skills required for the job in comparison to the skills that the employees have. So, the purpose here is to identify whether the interdepartmental coordination between Human Resource and Operations department lead to proper job-skill mapping in the organization. Thus, the following null and alternate hypotheses are formulated: -

Ho3(b)→ Interdepartmental coordination between Human Resource and Operations department does not lead to efficient competency mapping of the two departments.

Ha3(b)→ Interdepartmental coordination between Human Resource and Operations department leads to efficient competency mapping of the two departments.

Training and Development

Beach (2009) defines training as 'the organized procedure by which people learn knowledge and/or skill for a definite purpose'. Training constitutes a basic concept in human resource development. It is concerned with developing a particular skill to a desired standard by instruction and practice. Training and development is a function of human resource management concerned with organizational activity aimed at bettering the performance of individuals and groups in organizational settings. The endeavor here is to identify whether the Interdepartmental Coordination between Human Resource and Operations department leads to effective training and development. Thus, the following null and alternate hypotheses are formulated: -

Ho3(c)→ Human Resource and Operations interdepartmental coordination does not lead to efficient training and development.

Ha3(c)→ Human Resource and Operations interdepartmental coordination leads to efficient training and development.

Communication

Communication is the act of conveying intended meanings from one entity or group to another through the use of mutually understood signs and semiotic rules. It is the imparting or exchanging of information by speaking, writing, or using some other medium. Here we have to identify whether the Interdepartmental Coordination between Human Resource and Operations department leads to effective Communication. Thus, the following null and alternate hypotheses are formulated: -

Ho3(d)→ Human Resource and Operations interdepartmental coordination does not lead to effective communication between employees of the two departments.

Ha3(d)→ Human Resource and Operations interdepartmental coordination leads to effective communication between employees of the two departments.

Harmony

Harmony in the organization shown in agreement of actions, opinions, ideas and interest. If there is harmony present in the organization, the work will never be hampered and it will result in positive outcomes. The need here is to identify whether the Interdepartmental Coordination between Human Resource and Operations department leads to increase in Harmony. Thus, the following null and alternate hypotheses are formulated: -

Ho3(e)→ Human Resource and Operations interdepartmental coordination does not lead to better harmony between employees of the two departments.

Ha3(e)→ Human Resource and Operations interdepartmental coordination leads to better harmony between employees of the two departments.

Information Flow

Information Flow is any tracking of referential information by speakers. Information may be new, just introduced into the conversation; given, already active in the speakers' consciousness; or old, no longer active. The purpose here is to identify whether the Interdepartmental Coordination between Human

Resource and Operations department leads to better information flow. Thus, the following null and alternate hypotheses are formulated: -

Ho3(f)→ Human Resource and Operations interdepartmental coordination does not lead to effective information flow between employees of the two departments.

Ha3(f)→ Human Resource and Operations interdepartmental coordination leads to effective information flow between employees of the two departments.

4.2 Scope of Study

Area of survey will be Agra and National Capital Region.

As National Capital Region is the cluster of manufacturing companies in India and Agra is a tourist place respectively, various companies and services organisations will give a clear picture of coordination between human resource and operations department in the organisations.

4.3 Instruments

Primary Data

The tools used for primary data collection would be questionnaires and interviews (both structured and unstructured).

Secondary Data

Data will be collected through various magazines, journals, publication of marketing research agencies, newspapers, Internet and libraries.

4.4 Sampling

Sampling is concerned with the selection of a subset of individuals from within a statistical population to estimate characteristics of the whole population.

4.4.1 Sample Composition

Sample Composition for the proposed research consists of Multi-National Manufacturing corporations/companies and Services organizations such as hotels, transport and communication. Organisations which have well developed Human Resource and Operations department will be taken into consideration

4.4.2 Sampling Techniques

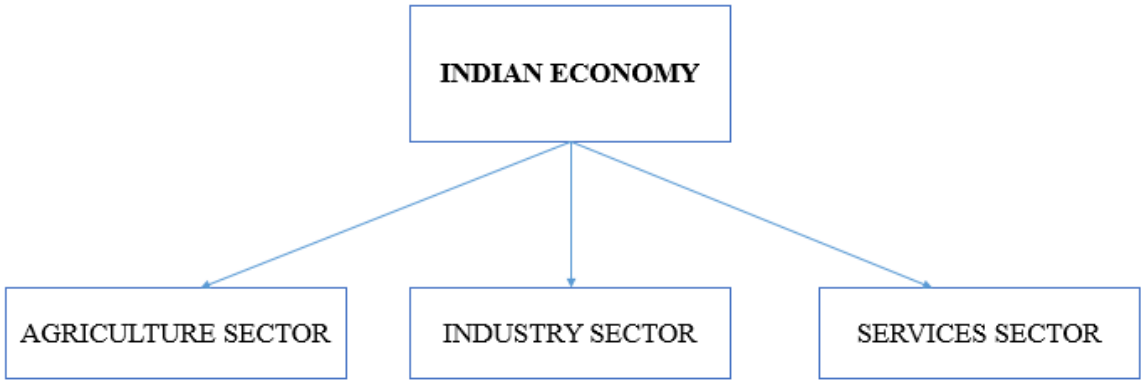
Techniques that will be used for sampling shall be Stratified Sampling.

In statistical surveys, when subpopulations within an overall population vary, it is advantageous to sample each subpopulation (stratum) independently. Stratification is the process of dividing members of the population into homogeneous subgroups before sampling. The strata should be mutually exclusive: every element in the population must be assigned to only one stratum. The strata should also be collectively exhaustive: no population element can be excluded. Then simple random sampling or systematic sampling is applied within each stratum. This often improves the representativeness of the sample by reducing sampling error.

4.4.3 Sample Plan

Indian economy is classified in three sectors — primary, secondary and tertiary sectors. Agriculture and allied, Industry and Services. Agriculture sector includes Agriculture (Agriculture proper & Livestock), Forestry & Logging, Fishing and related activities. Industry includes 'Mining & quarrying', Manufacturing (Registered & Unregistered), Electricity, Gas, Water supply, and Construction. Services sector includes 'Trade, hotels, transport, communication and services related to broadcasting', 'Financial, real estate & provisional services, 'Public Administration, defence and other services.

Figure 2: Indian Economy Sectors



Source: Ministry of Statistics and Programme Implementation, Planning Commission, Government of India, 21 Mar 2017

Services sector is the largest sector of India. Gross Value Added (GVA) that is GDP (Gross Domestic Product) at current prices for Services sector is estimated at 73.79 lakh crore INR in 2016-17. Services sector accounts for 53.66% of total India's GVA of 137.51 lakh crore Indian rupees. With GVA of Rs. 39.90 lakh crore, Industry sector contributes 29.02%. While, Agriculture and allied sector shares 17.32% and GVA is around of 23.82 lakh crore INR.

Table 2: GVA at current prices

	Sector	GVA (Rupees in Crore) at current prices						
		2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	% share
1	Agriculture Sector	1,501,816	1,680,798	1,932,692	2,067,935	2,172,910	2,382,289	17.32 %
1.1	Agriculture,forestry & fishing	1,501,816	1,680,798	1,932,692	2,067,935	2,172,910	2,382,289	17.32 %
2	Industry Sector	2,635,052	2,921,262	3,188,270	3,455,221	3,683,358	3,989,791	29.02 %
2.1	Mining & quarrying	261,035	285,776	295,716	313,844	296,041	309,178	2.25 %
2.2	Manufacturing	1,409,986	1,572,830	1,713,445	1,883,929	2,065,093	2,278,149	16.57 %
2.3	Electricity, gas, water supply & other utility services	186,668	215,164	259,840	279,456	321,765	338,396	2.46 %
2.4	Construction	777,363	847,492	919,269	977,992	1,000,459	1,064,068	7.74 %
3	Services Sector	3,969,789	4,603,255	5,245,305	5,947,260	6,595,670	7,378,705	53.66 %
3.1	Trade, hotels, transport, communication and services related to broadcasting	1,413,116	1,664,083	1,874,443	2,095,337	2,294,367	2,538,162	18.46 %
3.2	Financial, real estate & prof servs	1,530,691	1,776,023	2,069,386	2,363,328	2,632,432	2,896,300	21.06 %
3.3	Public Administration, defence and other services	1,025,982	1,163,149	1,301,476	1,488,595	1,668,871	1,944,243	14.14 %
	GVA at basic prices	8,106,656	9,205,315	10,366,266	11,470,415	12,451,938	13,750,786	100.00 %

Source: Ministry of Statistics and Programme Implementation, Planning Commission, Government of India, 21 Mar 2017

The above table depicts the bifurcation of Gross Value Added (Rupees in Crore) by each sector from 2011 to 2017 along with the percentage share contributed by each sector.

Gross value added (GVA) is the measure of the value of goods and services produced in an area, industry or sector of an economy, in economics. In national accounts GVA is output minus intermediate consumption, it is a balancing item of the national accounts' production account.

GVA is linked as a measurement to gross domestic product (gdp), as both are measures of output. The relationship is defined as:-

GVA + taxes on products - subsidies on products = GDP

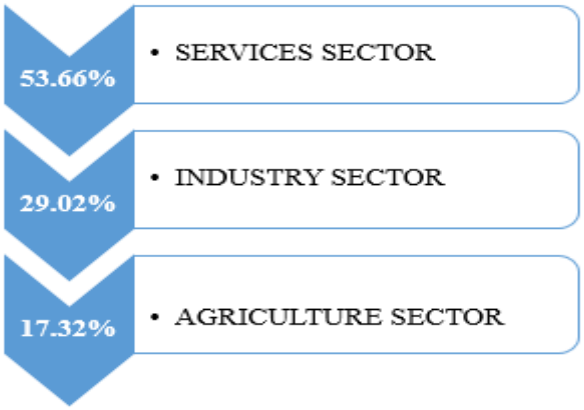
As the total aggregates of taxes on products and subsidies on products are only available at whole economy level, Gross value added is used for measuring gross regional domestic product and other measures of the output of entities smaller than a whole economy. Restated,

GVA = GDP + subsidies - (direct, sales) taxes

Thus, GVA is the grand total of all revenues, from final sales and (net) subsidies, which are incomes into businesses. Those incomes are then used to cover expenses (wages & salaries, dividends), savings (profits, depreciation), and (indirect) taxes.

According to the above contribution by each sector, GVA contributed by Agriculture, Industry and Services sector is as below: -

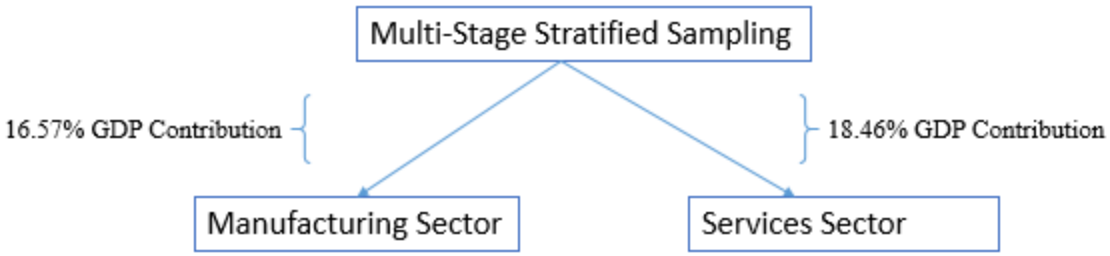
Figure 3: GVA contribution by different sectors



Source: Ministry of Statistics and Programme Implementation, Planning Commission, Government of India, 21 Mar 2017

The above figure depicts the GDP contribution by different sectors in descending orders. The highest percentage of GDP (53.66%) is contributed by Services sector which includes trade, hotels, transport, communication, services related to broadcasting, financial, real estate, provisional services, public administration, defence and other services. Second highest GDP (29.02%) is contributed by Industry sector which includes mining, quarrying, manufacturing, electricity, gas, water supply, other utility services and construction. Lowest GDP (17.32%) is contributed by the Agriculture sector which includes agriculture, forestry and fishing.

Figure 4: GDP contribution by Manufacturing and Services Sector



Source: Ministry of Statistics and Programme Implementation, Planning Commission, Government of India, 21 Mar 2017

Sample plan will focus on the equal number of respondents from manufacturing and services sector, surveys and interviews will be conducted with top, middle and bottom level of employees. Respondents will be surveyed on the basis of the proportion of top, middle and bottom level of employees in the organisations.

4.4.4 Sample Size Calculation

Taking a statistical approach for calculation of sample size, the various quantitative measures to be considered while determining the sample size are as follows: -

a) Variability of population characteristics or standard deviation *(σ)*

b) Level of confidence desired or *Z* value (taken as 1.96 for 95% confidence level desired)

c) Degree of precision desired in estimating population characteristics *(D)*

We have considered the following formula for testing hypothesis around mean Malhotra (2011).

$$n = \frac{\sigma^2 Z^2}{D^2}$$

Here, n = sample size

σ = Standard deviation

Z = Standard normal variate for 95% confidence level

and, D = Degree of precision desired

We have estimated a moderate Standard Deviation*(σ)* and a moderate Degree of Precision*(D)*.

Table 3: Values of σ and D

	Sample
σ	1
Z	1.96
D	0.10
n	227.21

Source: Self

$$n = \frac{(1)^2 (1.96)^2}{(0.10)^2} = 227.21 \approx 228$$

With reference to the above equation, we compute the sample size of the study to be 228.

4.5 Statistical Techniques

Descriptive and inferential statistical tools like Chi Square Test, ANOVA, etc. shall be used.

Section V: Chapterization

The thesis will contain the following chapters: -

Chapter 1 - Introduction

Chapter 2 - Review of Literature

Chapter 3 - Research Design

Chapter 4- Data Collection and Analysis

Chapter 5 - Case study

Chapter 6 - Synthesis and Triangulation

Chapter 7 - Conclusions, Managerial Implications and Direction for Future Research

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